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**A REDEFINITION OF THE BUTTERFLY GENERA TATOCHILA,  
PHULIA, PIERCOLIAS, AND BALTIA, WITH DESCRIPTIONS  
OF RELATED GENERA AND SUBGENERA**

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The genera of butterflies treated in this paper are those labeled by Klots (*Ent. Americana*, vol. 12, new ser., pl. 13, fig. 100, 1933) as the "Tatocheilae-Phulia" branch of the family tree. These genera probably will be considered as constituting a subtribe of the Pierini when that tribe is subdivided.

The history of revisionary work in the Rhopalocera shows that the systematics of the group has progressed by three main stages. The earliest workers studied the habitus (shape, color, and pattern) of the wings almost exclusively. Before the middle of the 19th century the veins of the wings were discovered to be of great value and were thereafter used extensively in revisionary work. A few years later the male genitalia were found to be of great systematic value and slowly were used by more and more workers throughout a large part of the Rhopalocera.

Surprisingly, studies of the female genitalia were almost never attempted, partly because the females were frequently harder to dissect and because of an erroneous contention of early workers that the female genitalia were of little taxonomic value. We know today that this is not true, and it has been demonstrated numerous times

that the female genitalia are often as useful as the male genitalia in ascertaining the relationship of butterfly groups.

Concerning the genera now under scrutiny, the soundest early works were those of Butler (Cist. Ent., vol. 1, pp. 33-58, 1870) and Grote (Proc. Amer. Philos. Soc., vol. 39, pp. 4-67, 1900) and were based, according to the practice of that time, mainly upon venational characters. To these studies Klots (loc. cit., pp. 217-220) added a study of the male genitalia, arriving at a fairly satisfactory generic treatment which was superior to all similar generic studies in the Rhopalocera and was certainly an outstanding landmark.

In preparing the present paper, the male genitalia, venation, and habitus were thoroughly studied and evaluated. Also, the legs, including the claws (which proved to be of great value), and the female genitalia were studied.

The complexities of relationship among the genera studied were found to be much greater than heretofore believed. The use of any one character (or kind of character) alone was found to produce a different alignment than when some other character was employed. Thus, a consideration of the uncus alone shows *Theochila*, new genus; *Tatochila*; *Phulia* (*Infraphulia*, new subgenus); *Piercolias*; and *Baltia* to be quite distinct from one another, while *Hypsochila* and *Phulia* (*Phulia*) would be considered very close to each other and quite like *Tatochila*. Considering the aedeagus only, one group of the genus *Tatochila* and the genera *Hypsochila*, *Phulia*, *Piercolias*, and *Baltia* would certainly seem to be nearly identical, while *Theochila* and four of the species groups of *Tatochila* would appear to be quite different from each other and from those mentioned above. On the other hand, *Hypsochila*, *Phulia*, *Piercolias*, and *Baltia* differ greatly from *Theochila* and *Tatochila* in lacking the tibial spurs of the mid and hind legs. Again, if we placed too much emphasis upon the claws, paronychialia, and pulvilli, we would place *Hypsochila* and *Theochila* an unreasonable distance from the other genera and from each other. A consideration of the number and fusion of the radial veins taken by itself would give us the unnatural alignment of having *Theochila*, *Tatochila*, *Hypsochila*, and the nominotypical subgenus of *Piercolias* at one end (with four radial veins), one species of *Phulia* (*Infraphulia*) at the other end (with two radial veins), and *Phulia* (*Phulia*), a second species of *Phulia* (*Infraphulia*), and *Piercolias* (*Pierphulia*, new subgenus), in the middle (with three radial veins).

It became quite obvious, if we were going to attain a nearly natural classification, that all of these characters had to be considered and used. The result was that sometimes special importance was given to a single structure in one genus (or in several genera) and that much less importance had to be given that same structure in another genus (or in several other genera).

Two of the genera treated below are each divided into two subgenera upon characters that certainly would be considered of generic instead of subgeneric value if it were not for the fact that they could not be separated upon habitus. It did not seem logical, for example, to treat the subgenera *Phulia* and *Infraphulia* as separate genera—in spite of the several really important differences in male and female genitalia and venation—simply because they look so very much alike. Thus, habitus was regarded as being of great importance and genera were not divided unless differences in habitus supported the other reasons for such division. On the other hand, habitus differences alone were not regarded as sufficient to divide genera. Thus, the two species of *Baltia*, although differing greatly in habitus (one species resembling *Piercolias* and the other somewhat resembling *Phulia*) were retained together in the genus *Baltia* because other characters did not support a division based upon habitus differences either on the generic or the subgeneric level.

The species here transferred to *Piercolias* (*Pierphulia*) were taken from *Phulia*, where they have hitherto been placed, because of the differences in the uncus of the male, in the inner genital plates of the female, and in other characters which were supported by habitus differences. On the other hand they could not be regarded as typical *Piercolias* (except on habitus characters) because of some differences in these same structures and in venation.

All of the genera treated here are Neotropical in distribution except *Baltia*, which occurs only in the Himalayas of central Asia. Klots (loc. cit., p. 219) says "whether there is a real relationship between *Baltia* and *Phulia* or whether the resemblances are merely to be regarded as similar developments in the same type of environment is a matter of doubt." Klots had the false notion that *Phulia* and *Baltia* both lacked pulvilli and paronychialia. These structures are present in all of the genera here treated but are sometimes so greatly reduced in *Phulia*, *Peircolias*, and *Baltia* that they cannot be seen without dissection and great magnification. *Baltia*, however, in the majority of its characters, certainly seems more closely related to these Neotropical genera with which Klots has placed it than to any of the Old World genera.

Of the Neotropical genera, *Theochila* is found in the southern nontropical parts of Brazil and eastern Argentina; *Tatochila* in Colombia, Ecuador, Peru, Bolivia, Argentina, and south to Tierra del Fuego; *Hypsochila* in the Andes of Bolivia and Peru, south to the high elevations in central Chile and west-central Argentina, and south from there to Tierra del Fuego; *Phulia* in the high Andes of Bolivia and Peru, south to the high elevations in central Chile and west-central Argentina, and *Piercolias* in the Andes of Bolivia and Peru, south into northern Chile.

In the treatment below, the species belonging to each of the genera are neither described nor discussed, but are merely assigned to their proper place. Subspecies are not listed at all in this paper. Complete specific accounts will be offered at a later date by both the present writer and by Prof. José Herrera-G. of the University of Chile.

### Key to the genera and subgenera treated in this paper

1. Tibial spurs present on mid and hind legs . . . . . 2  
Tibial spurs absent on mid and hind legs . . . . . 3
2. Male with uncus distinctly shorter than its greatest width (dorsal or ventral view) (fig. 9); female with inner genital plate having a finger-like process that is nearly parallel to the anterior lobe (fig. 34); claw short and thick, only slightly more than twice as long as its width at base (fig. 25).  
**Theochila** (p. 106)  
Male with uncus at least as long as its greatest width (dorsal or ventral view) (fig. 10); female with inner genital plate having a finger-like process that is not parallel to anterior lobe (fig. 35); claw nearly three times as long as its width at base (fig. 26) . . . . . **Tatochila** (p. 108)
3. Forewing with four radial veins . . . . . 4  
Forewing with two or three radial veins . . . . . 5
4. Forewing with vein  $M_2$  from apex of cell or from very near apex of cell (connate or nearly connate with base of  $R_3+R_{4+5}+M_1$ ) (fig. 19).  
**Hypsochila** (p. 110)  
Forewing with  $M_2$  from distinctly below apex of cell (fig. 23) (see third choice) . . . . . **Piercolias (Piercolias)** (p. 118)  
Forewing with  $M_2$  stalked with base of  $R_3+R_{4+5}+M_1$  (fig. 24).  
**Baltia** (p. 118)
5. Hindwing with  $Cu_2$  arising from near middle of cell and about opposite origin of  $R_s$  (figs. 20, 21); with distance between bases of  $Cu_1$  and  $Cu_2$  on the hindwing equal to the distance between bases of  $R_s$  and  $M_1$  (figs. 20, 21) . . . . . 6  
Hindwing with  $Cu_2$  arising from distinctly beyond middle of cell and not at all opposite origin of  $R_s$  (fig. 22); with distance between bases of  $Cu_1$  and  $Cu_2$  on the hindwing less than the distance between the bases of  $R_s$  and  $M_1$  (fig. 22) . . . . . **Piercolias (Pierphulia)** (p. 117)
6. Forewing with  $R_1$  from less than two-thirds to about one-half the length of  $R_2$  (fig. 20); hind leg with femur shorter than tibia; harpe acuminate (fig. 4) . . . . . **Phulia (Phulia)** (p. 114)  
Forewing with  $R_1$  nearly the same length as  $R_2$  or only slightly shorter (fig. 21); hind leg with femur about same length as tibia; harpe blunt (fig. 5).  
**Phulia (Infraphulia)** (p. 114)

### *Theochila*, new genus

TYPE: *Pieris maenacte* Boisduval = *Theochila maenacte* (Boisduval), new combination.

*Theochila* differs from the other genera chiefly in the aedeagus, anellus, and uncus of the male genitalia and in the inner genital plate of the female. In addition it differs from most species of *Tatochila* in the position of vein  $Cu_2$  of the hindwing and from all of

the related genera in the form of the claws, paronychialia, and pulvilli as well as in habitus.

**VENATION:** Figure 17. Forewing with four radial veins,  $R_5$  having anastomosed with  $R_4$ ;  $R_1$  long, only slightly shorter than  $R_2$ ;  $R_2$  from apex of cell or very close to the apex;  $M_2$  from well below apex of cell. Hindwing with  $Cu_2$  from distinctly beyond middle of cell and not opposite to origin of  $R_6$  and with distance between bases of  $Sc+R_1$  and  $R_6$  about equal to distance between  $Cu_2$  and  $M_3$ ; distance between bases of  $Cu_1$  and  $Cu_2$  greater than distance between bases of  $R_6$  and  $M_1$ .

**LEGS:** As in *Tatochila* with a pair of apical spurs present on mid and hind tibiae. Paronychium (fig. 25) about as long as claw and broad, about one-half as wide as its length and broadly rounded distally. Claw (fig. 25) directed somewhat outward and with its dorsal margin greatly arched, its long axis nearly parallel to basal margin; extremely short and thick, only about twice as long as its width at base. Tooth somewhat divergent from distal portion of claw and originating from distinctly beyond middle; about equal in size to distal portion of claw, with dorsal margin of tooth about equal to width of claw at base. Pulvillus (fig. 25) broad, much broader than base of claw.

**GENITALIA:** Male (figs. 1, 9) with uncus short, distinctly shorter than greatest width (ventral or dorsal view) and equal to about one-third the length of tegumen; distal half of uncus finger-like, gradually tapering, not distinctly swollen behind tip and lacking the lateroventral internal ridges or infoldings of the lateral walls found in *Tatochila*, *Hypsochila*, and *Phulia* (*Phulia*); harpe acuminate; subscaphium absent; anellus with a dorsal plate which together with the ventral plate completely surrounds the aedeagus; aedeagus in lateral view very broad and flat distally, at least twice as wide as in the middle.

Female (fig. 34) with ductus bursae as long as bursa copulatrix (excluding the accessory pouch), not sclerotized except posteriorly where there is a large bulbous structure containing the ostium and to which the ductus seminalis attaches dorsally; eighth tergite entire and semiannulate; eighth sternite with outer genital plate large and smooth; inner genital plates entirely setulose on outer surfaces and each divided into a posterior finger-like lobe and an anterior lobe that has its posterior margin nearly parallel to the finger-like lobe.

**HABITUS:** Wings white above with apex of forewing fuscous and without a distinct silvery white sheen except at base of wings. Male with both wings mainly white to pale yellowish white below. In the female this yellow is somewhat stronger. Black discocellular spot missing on both surfaces of forewing in both sexes. With a

faint orange spot at base of hindwing below and with black outlining veins on hindwings below very faint in the male, somewhat stronger in the female.

SPECIES:

1. *Theochila maenacte* (Boisduval), Histoire naturelle des insectes. Species général des lépidoptères, vol. 1, p. 517, 1836 (*Pieris*).

***Tatochila* Butler**

*Tatochila* Butler, Cist. Ent., vol. 1, pp. 38, 51-52, 56, pl. 3, fig. 7, 1870.

TYPE: *Synchlōe autodice* Hübner = *Tatochila autodice* (Hübner). Type by original designation (misspelled as *T. autodyce*).

Remarks: In *Tatochila* the female genitalia are rather similar to *Hypsochila* and *Phulia* (*Phulia*). It differs from those genera in possessing a pair of tibial spurs on the mid and hind legs and from all related genera in the form of the claws.

VENATION: Figure 18. Forewing with four radial veins,  $R_5$  having anastomosed with  $R_4$ ;  $R_1$  usually from one-half to two-thirds length of  $R_2$ ;  $R_2$  from distinctly before apex of cell;  $M_2$  from well below apex of cell. Hindwing with  $Cu_2$  either from near middle of cell and about opposite origin of  $R_8$  or with  $Cu_2$  distinctly beyond middle of cell and not opposite origin of  $R_8$ ; distance between bases of veins  $Sc+R_1$  and  $R_8$  about equal or greater than distance between bases of veins  $Cu_2$  and  $M_3$ ; distance between veins  $Cu_1$  and  $Cu_2$  greater or about equal to the distance between bases of  $R_8$  and  $M_1$ .

LEGS: As in *Theochila* with a pair of spurs present on mid and hind tibiae. Paronychium (fig. 26) narrower than in *Theochila* and more pointed distally and about as in *Hypsochila*, being at least two-thirds as long as claw, constricted near the middle and tapering and with its width at base from one-fourth to one-third of its length. Claw (fig. 26) directed outward with its dorsal margin gradually curved and its long axis divergent from basal margin; relatively long, at least three times as long as its width at base. Tooth usually divergent from distal portion of claw and originating from beyond the middle or sometimes from near the middle (*T. microdice*), only slightly shorter than distal portion of claw beyond tooth and with its dorsal margin nearly equal or slightly less than width of claw at base, not distinctly longer than this width. Pulvillus (fig. 26) not distinctly broader than width of claw at base, usually more narrow.

GENITALIA: Male (figs. 2, 10) with uncus relatively long and slender, at least as long as its width (in ventral view), usually longer and at least one-half as long as length of tegumen; distal one-third to one-half of uncus finger-like and distinctly swollen immediately in front of tip; behind this finger-like tip there is a long, lateroventral platelike internal ridge on either side, these ridges sometimes appearing to be infoldings of the lateral walls; harpe acuminate; subscaphium

usually absent, sometimes faintly indicated; anellus without a dorsal plate; aedeagus in lateral view not distinctly broader distally than through middle or much less than twice as wide as in middle.

Female (fig. 35) with ductus bursae as long as bursa copulatrix (excluding the accessory pouch); usually with a ribbon-like plate immediately anterior to ostium and usually with a separate subtriangular or crescentic shaped plate on ventral surface anterior to this. Sometimes this plate completely rings the ductus bursae and sometimes it is fused to the ribbon-like plate. Ductus seminalis attached dorsally to nonsclerotized area opposite the area between these two plates; remainder of ductus bursae nonsclerotized. An exception to the above types of bursae is that found in *T. xanthodice* which has that structure entirely nonsclerotized. Eighth tergite entire and semiannulate; eighth sternite with outer genital plate large and reticulate; inner genital plate entirely setulose on outer surface, divided into a posterior finger-like lobe and an anterior subtriangular lobe, these lobes not parallel but distinctly farther apart near their base than at apex.

**HABITUS:** Discocellular spot present on forewing and very distinct at least on upper surfaces. Wings below with veins outlined with fuscous or black, at least in the female, or around outer margin of hindwing and on apex of forewing in the male, usually extending along entire length of veins in hindwing. Ground color of hindwing and apex of forewing below in both sexes usually yellow or at least with some yellow either in base of hindwing or around outer margin of hindwing and apex of forewing. Usually with at least one orange spot in base of hindwing and with an orange streak along costal margin of this wing. Ground color of wings above white, cream or yellow with the silvery sheen restricted to the base.

#### SPECIES:

1. *Tatochila theodice* (Boisduval), Voyage de découvertes de *l'Astrolabe*, pt. 1, Lépidoptères, p. 51, 1832 (*Pieris*).
2. *Tatochila autodice* (Hübner), Beiträge zur Sammlung exotischer Schmetterlinge . . . vol. 1, p. 26, 1818; pl. 27, figs. 151, 152, [1814-1818] (*Synchlōe*).
3. *Tatochila blanchardii* Butler, Trans. Ent. Soc. London, pp. 472-473, 1881.
4. *Tatochila microdice* (Blanchard), in Gay, Historia física y Política de Chile, Zoología, vol. 7, p. 14, 1852 (*Pieris*).
5. *Tatochila vanvolxemii* (Capronnier), Ann. Soc. Ent. Belgique, vol. 17, p. 11, pl. 1, fig. 1, 1874 (*Pieris*).
6. *Tatochila mercedis* (Eschscholtz), in Kotzebue, Entdeckungs-Reise in die Süd-See und nach der Berings-Strasse . . . vol. 3, p. 215, pl. 9, fig. 22a, 1821 (*Pontia*).
7. *Tatochila inversa* Hayward, Acta Zool. Lilloana, Inst. "Miguel Lillo," vol. 7, pp. 136-137, 1949.
8. *Tatochila orthodoxa* (Weymer), in Weymer & Maassen, in Stübel and Reiss, Reisen in Süd-Amerika . . . Lepidopteren . . . , pp. 99, 124, pl. 3, fig. 20, 1890 (*Pieris*).

9. *Tatochila homoeodice* Paravicini, Mitt. Schweizerischen Ent. Ges., vol. 12, pt. 1, p. 23, 1910.
10. *Tatochila sagittata* Röber, in Seitz, Die Gross-Schmetterlinge der Erde . . . , vol. 5, p. 57, pl. 18, fig. 1, 1908.
11. *Tatochila stigmadice* (Staudinger), Deutsche Ent. Zeitschr., "Iris," Dresden, vol. 7, pp. 62-63, 1894 (*Pieris*).
12. *Tatochila xanthodice* (Lucas), Rev. Mag. Zool., ser. 2, vol. 4, pp. 337-338, 1852 (*Pieris*).
13. *Tatochila distincta* Jörgensen, Anales Mus. Nac. Hist. Nat. Buenos Aires, vol. 38, pp. 465-467, figs. 6, 7, 1916 (*Pieris*).

### *Hypsochila Ureta*

*Hypsochila Ureta*, Bol. Mus. Nac. Hist. Nat., vol. 26, p. 58, 1955.

TYPE: *Tatochila microdice* f. *wagenknechti* Ureta=*Hypsochila wagenknechti* (Ureta). Type by original designation.

This genus differs from *Tatochila*, its nearest relative, and from the other genera in the shape of the claws. From *Tatochila* and *Theochila* it differs in lacking tibial spurs on mid and hind tibiae and in the position of vein  $M_2$  on forewing as well as in habitus. From *Phulia* and *Piercolias* (*Pierphulia*) it differs also in having proportionately broader wings and in having four radial veins present on the forewing. It differs from all of the other genera in having the silvery sheen on forewing extending over a much larger area.

VENATION: Figure 19. Similar to that of *Tatochila* and *Theochila*, differing in having  $M_2$  of forewing from apex of cell or from very near apex of cell. Forewing with four radial veins,  $R_5$  having anastomosed with  $R_4$ ;  $R_1$  more than one-half but not more than two-thirds the length of  $R_2$ ;  $R_2$  from distinctly before apex of cell. Hindwing with  $Cu_2$  from near middle of cell and about opposite to origin of  $R_5$ ; distance between bases of veins  $Sc+R_1$  and  $R_5$  about equal to the distance between  $Cu_2$  and  $M_3$ ; distance between  $Cu_1$  and  $Cu_2$  about equal to the distance between the bases of  $R_5$  and  $M_1$ .

LEGS: Spurs lacking on all three tibiae. Paronychium (fig. 27) at least two-thirds as long as claw, rather narrow, tapering and slightly constricted near middle and with its width at base about one-fifth its length. Claw (fig. 27) directed outward with its dorsal margin gradually curved and its long axis divergent from basal margin; relatively long, at least three times as long as width at base. Tooth divergent from distal portion of claw, originating from near the middle and very small, having its dorsal margin less than width of claw at base. Pulvillus (fig. 27) narrow, about one-half as broad as base of claw.

GENITALIA: Male (figs. 3, 11) with uncus, harpe, and anellus not different from that of *Tatochila*; subsclaphium absent or only very faintly indicated; aedeagus in lateral view about as broad distally



as through the middle, and deeply incised both dorsally and ventrally from one-half to one-third its entire length. The aedeagus is thus similar to that of *T. xanthodice* and *T. distincta* of group E of *Tatochila*. [The five groups of *Tatochila* are defined in a second paper, in press.]

Female (fig. 36) with ductus bursae very similar to *Tatochila*, differing chiefly in the reduced sclerotization, having a very narrow and faint ribbon-like plate immediately anterior to ostium and either lacking other sclerotization or having a very small ventral plate anterior to this ribbon-like one. Eight tergite and sternite as in *Tatochila*.

**HABITUS:** Wings above in both sexes with ground color white and with the silvery sheen at base extending throughout most of the cell of the forewing, otherwise similar to *Tatochila*, having the discal spot present on forewing on both surfaces and having the black sagittate markings in apex of forewing with a submarginal series of spots or a solid band inward from these markings. Undersurfaces with ground color of hindwing and apex of forewing yellow with veins in these areas overlaid with fuscous. Costa of hindwing orange and with a white spot at end of cell on this wing.

Ureta (Bol. Mus. Nac. Hist. Nat., vol. 26, pp. 66, 67, 1955) established a new subgenus, *Chionanema*, thereby dividing the genus *Hypsochila*. However he did not describe the typical subgenus except by inference. He included in *Hypsochila* (*Chionanema*) a single species, known from a single specimen. The characters he selected for this subgenus do not seem to me to be of more than specific value. However, I am retaining this subgenus until I am able to examine the species upon which it was established and ascertain if it displays characters of subgeneric value.

### *Hypsochila* (*Hypsochila*) Ureta

Reference and type species as given above under the genus.

For reasons given above, this nominotypical subgenus is not here assigned characters.

#### SPECIES:

1. *Hypsochila* (*Hypsochila*) *argyrodice* (Staudinger), Hamburger magalhaensische Sammelreise, vol. 2, No. 6, pp. 14-17, fig. 11, 1899 (*Tatochila*).
2. *Hypsochila* (*Hypsochila*) *wagenknechti* Ureta, Rev. Chilena Hist. Nat., vol. 41 (1937), pp. 278-283, pl. 12, fig. 3♂, 4♀, text fig. 39, 1938 (*Tatochila*). (Note: Although this name was originally treated by Ureta as a "form" he later elevated it to full specific rank; it is clear from his original description that his term "form" comes within the meaning of the term subspecies, so that his name is here treated as being available as of the original date.)
3. *Hypsochila* (*Hypsochila*) *galactodice* Ureta, Bol. Mus. Nac. Hist. Nat., vol. 26, pp. 65-66, pl. 2, fig. 3, 1955.

*Hypsochila (Chionanema) Ureta*

*Hypsochila (Chionanema) Ureta*, Bol. Mus. Nac. Hist. Nat., vol. 26, pp. 66, 67 pl. 1, fig. 3, pl. 2, fig. 4, 1955.

TYPE: *Hypsochila (Chionanema) peñai* Ureta. Type by original designation.

This subgenus is supposed to differ from the typical one in having a straighter costal margin on forewing with a narrower discal cell as well as in certain venational characters and in having proportionally larger eyes. As mentioned above none of the described characters seem to be of more than specific value to the present writer.

VENATION: Forewing with  $R_3 + R_{4+5}$  (stated in original description as  $R_{3+4} + R_5$ ) longer than in *Hypsochila (Hypsochila)*, with  $M_2$  and  $M_3$  nearly parallel and with  $Cu_1$  and  $Cu_2$  subparallel with greater divergence distally than in *Hypsochila (Hypsochila)*. Hindwing with veins less divergent outward.

LEGS: Not mentioned in original description.

GENITALIA: According to the original figure (loc. cit., pl. 2, fig. 4) not differing except specifically from the typical subgenus.

HABITUS: Wings above with marginal sagittate markings greatly enlarged and entirely confluent with submarginal series of spots causing the entire apex of wing down to vein  $Cu_1$  to be largely black except for small yellowish white dashes between the veins. Under-surfaces with ground color white and with all dark markings heavier than in *Hypsochila*.

SPECIES:

1. *Hypsochila (Chionanema) peñai* Ureta, Bol. Mus. Nac. Hist. Nat., vol. 26, No. 4, pp. 67, 69, pl. 2, fig. 4, 1955.

*Phulia Herrich-Schaeffer*

*Phulia* Herrich-Schaeffer, Correspondenz-blatt Naturw. verein, Regensburg, vol. 21, No. 9. pp. 105, 144, 1867.

TYPE: *Pieris nymphula* Blanchard = *Phulia nymphula* (Blanchard). Type by reason of being the sole included species.

*Phulia* differs from all the other genera in habitus and from all except *Piercolias (Pierphulia)* in the claws. From *Hypsochila*, *Theochila*, *Tatochila*, and *Piercolias (Piercolias)* it differs in having three or only two radial veins on the forewing. From *Theochila* and *Tatochila* it differs also in lacking tibial spurs. From *Piercolias* it differs in addition in the form of the uncus, in the female genitalia, and in the position of vein  $Cu_2$  of hindwing.

VENATION: Figures 20, 21. Forewing with three radial veins,  $R_4$  and  $R_5$  having anastomosed with  $R_3$  or with two radial veins,  $R_{3+4+5}$  having anastomosed with  $M_1$ . Vein  $R_1$  about one-half or less than two-thirds length of  $R_2$  in the typical subgenus and in the other

subgenus with  $R_1$  about the same length as  $R_2$ ;  $M_2$  stalked with base of  $R_{3+4+5}+M_1$ ;  $R_2$  from well before or near apex of cell. Hindwing with  $Cu_2$  from near middle of cell and about opposite origin of  $R_s$  and with distance between bases of vein  $Sc+R_1$  and vein  $R_s$  about equal or slightly less than distance between bases of  $Cu_2$  and  $M_3$ ; distance between veins  $Cu_1$  and  $Cu_2$  slightly less, about equal or greater than distance between bases of  $R_s$  and  $M_1$ .

LEGS: Spurs lacking on all three tibiae. Paronychium (figs. 28, 29) (not absent as reported by Klots, loc. cit., pp. 146, 219) as described for the two included subgenera. Claw (figs. 28, 29) directed distinctly downward, with its dorsal margin very gradually curved and its long axis nearly parallel to the basal margin; relatively long, at least three times as long as its width at base. Tooth closely approximate to distal portion of claw and originating from before the middle or from near the middle; only slightly shorter than distal portion of claw and usually having its dorsal margin much longer than width of claw at base. Pulvillus (figs. 28, 29) narrow and greatly reduced, being from less than one-half to one-half the width of base of claw.

GENITALIA: Male (figs. 4, 5, 12, 13) similar to *Tatochila*, with uncus relatively long and slender as compared with *Theochila* and *Baltia*. Distal one-third to one-half of uncus finger-like and distinctly swollen behind tip; base of uncus lacking the lateroventral internal ridges in the atypical subgenus and possessing them in the typical one. Harpe may be acuminate or rounded distally; subscaphium sometimes present; anellus hardly different from *Tatochila* and *Hypsochila*; aedaegus not distinctly broader distally and quite similar to *Hypsochila* and group E of *Tatochila*, being deeply incised both dorsally and ventrally. [The groups of *Tatochila* are defined in a second paper, in press.]

Female (figs. 37, 38) with ductus bursae at least as long as bursa copulatrix (without the accessory pouch) and colorless and non-sclerotized. Other characters as described under the two separate subgenera.

HABITUS: Hindwing and apex of forewing below with ground color yellow and with veins broadly bordered with stripes of brown or gray and with these stripes outlined with black on the margin. Hindwing on this surface with a black stripe through the middle of cell and in interspace  $Cu_2$  and with a series of submesial black spots between the veins.

The genus *Phulia* is here divided into two subgenera, *Phulia* and *Infraphulia*, the latter being erected for two species (one as yet undescribed) that differ greatly from *Phulia* in characters of male and female genitalia that would ordinarily be considered of generic value. Indeed the lack of the accessory pouch of the bursa copulatrix and the

reduced and modified signa in the females are so unique that they are not known to occur elsewhere in the subfamily. To separate *Infraphulia* from *Phulia* as a distinct genus would mean overlooking the very great similarities in habitus, in claws, and in venation. For these reasons, *Infraphulia* is treated here as a subgenus in the genus *Phulia*.

### *Phulia (Phulia) Herrich-Schaeffer*

Reference and type species as given above under the genus.

Distinguished from *Phulia (Infraphulia)* chiefly in the uncus and harpe of the male and in the female genitalia.

VENATION: Figure 20. Forewing with three radial veins,  $R_{4+5}$  having anastomosed with  $R_3$ ;  $R_1$  short, being from less than two-thirds to about one-half the length of  $R_2$ . Hindwing with distance between base of  $Cu_1$  and  $Cu_2$  not distinctly greater than distance between  $R_3$  and  $M_1$ .

LEGS: Paronychium (fig. 28) greatly reduced, being slightly less than one-third the length of claw, triangular in shape and with its width at base about one-half its length.

GENITALIA. Male (figs. 4, 12) with lateroventral wall at base of uncus well folded inward and closely appressed upon its inner side; subscaphium absent; with a large weakly sclerotized clasper flap on inner face of harpe near middle and with harpe acuminate.

Female (fig. 37) with eighth tergite entire and semiannulate; eighth sternite with inner genital plate not reduced, divided into a broad subtriangular shaped anterior lobe and a smaller finger-like projection posterior to this and with both of these parts entirely and thickly setulose; signum of the common pierid type, being a single long bilobed and heavily dentate bar on dorsal surface of bursa near opening of ductus bursae.

Species:

1. *Phulia (Phulia) nymphula* (Blanchard), in Gay, Historia física y política de Chile, Zoología, vol. 7, p. 14; Atlas, vol. 2, Lepidópteros, pl. 1, figs. 3a, 3b, 1852 (*Pieris*).
2. *Phulia (Phulia) paranympa* Staudinger, Deutsche Ent. Zeitschr., "Iris," Dresden, vol. 7, pp. 44-46, pl. 1, figs. 5, 10, 12, 1894.
3. *Phulia (Phulia) nymphagoga* Röber, in Seitz, Die Gross-Schmetterlinge der Erde . . . vol. 5, p. 97, pl. 28, figs. d4, d5, 1909.
4. *Phulia (Phulia) nannophycs* Dyar, Proc. U. S. Nat. Mus., vol. 45, p. 629, 1913.

### *Phulia (Infraphulia)*, new subgenus

TYPE: *Phulia nymphula* var. *illimani* Weymer=*Phulia (Infraphulia) illimani* Weymer.

This subgenus is unique in the Pierinae in lacking the accessory pouch of the bursa copulatrix. It differs also from *Phulia (Phulia)* in the uncus and harpe.

VENATION: Figure 21. Forewing either with three radial veins ( $R_{4+5}$  having anastomosed with  $R_3$ ) or with two radial veins ( $R_{3+4+5}$  having anastomosed with  $M_1$ );  $R_1$  long, nearly the same length as  $R_2$  or only slightly shorter. Hindwing with the distance between bases of  $Cu_1$  and  $Cu_2$  greater than distance between  $R_s$  and  $M_1$ .

LEGS: Paronychium (fig. 29) slightly over one-half length of claw, rather narrow, tapering and constricted near middle with its width at base about one-half its length.

GENITALIA: Male (figs. 5, 13) with lateroventral wall at base of uncus not at all folded inward; subscaphium present, only slightly sclerotized, harpe broadly produced apically and not acuminate and with a small clasper flap above middle on inner face.

Female (fig. 38) with eighth tergite not developed in dorsal region, forming two subtriangular shaped lateral plates; these plates are much broader than the lateral arms of the eighth tergite in *Phulia* (*Phulia*) and are more distad of the eighth sternite than in that subgenus; inner pair of genital plates greatly reduced, being a narrow sclerotized smooth band and lacking the finger-like process; signum reduced in size and with a very few dentations or entirely smooth and semi-circular in shape; bursa lacking the accessory pouch found in most pierids.

SPECIES:

1. *Phulia* (*Infraphulia*) *illimani* Weymer, in Weymer and Maassen, in Stübel and Reise, Reissen in Süd-Amerika . . . Lepidopteren . . . pp. 98, 125, pl. 4, fig. 12, 1890.

### *Piercolias* Staudinger

*Trifurcula* Staudinger, Deutsche Ent. Zeitschr., "Iris," Dresden, vol. 7, pt. 1, pp. 56-59, July 14, 1894. TYPE: *Trifurcula huanaco* Staudinger=*Piercolias huanaco* (Staudinger), by reason of being single included species. Preoccupied by *Trifurcula* Zeller, 1848 (Lepidoptera: Nepticulidae).

*Piercolias* Staudinger, Deutsche Ent. Zeitschr., "Iris," Dresden, vol. 7, pt. 1, p. 56, 1894; Grote, Canadian Ent., vol. 35, p. 139, 1903. This is a Staudinger manuscript name, mentioned in the original description of *Trifurcula* as a name that author formerly used for the genus. Grote applied it to the genus after discovering that *Trifurcula* Staudinger was preoccupied. Some authors have attributed the name *Piercolias* to Grote; however, following section 115, paragraph 2, page 63 of the Copenhagen Decisions on Zoological Nomenclature, 1953, the name *Piercolias* of Staudinger is here accepted, even though it was originally a manuscript name.

*Andina* Staudinger, Deutsche Ent. Zeitschr., "Iris," Dresden, vol. 7, p. ii (of the Inhalts-Uebersicht), 1895. Röber, in Seitz, Gross-Schmetterlinge der Erde . . . , vol. 5, p. 97, 1909. TYPE: *Trifurcula huanaco* Staudinger=*Piercolias huanaco* (Staudinger), by reason of being sole included species in *Trifurcula*, for which *Andina* is a substitute name.

TYPE: *Trifurcula huanaco* Staudinger=*Piercolias huanaco* (Staudinger).

*Piercolias* differs from all the other genera in the uncus, in the female genitalia, and in habitus. From *Phulia* it differs also in the position of  $Cu_2$  in hindwing. From *Tatochila* and *Theochila* it differs in lacking tibial spurs on mid and hind legs and in the form of the claw.

VENATION: Figures 22, 23. Forewing with three radial veins,  $R_{4+5}$  having anastomosed with  $R_3$ , or with four radial veins,  $R_5$  having anastomosed with  $R_4$ ;  $R_1$  long, nearly same length as  $R_2$  or only slightly shorter;  $M_2$  from below apex of cell or stalked with base of  $R_{3+4+5} + M_1$ ;  $R_2$  from apex or from very near apex of cell. Hindwing with  $Cu_2$  from distinctly beyond middle of cell and not at all opposite origin of  $R_3$  and with distance between bases of veins  $Sc + R_1$  and  $R_3$  distinctly greater than distance between  $Cu_2$  and  $M_3$ ; distance between veins  $Cu_1$  and  $Cu_2$  distinctly less than distance between bases of  $R_3$  and  $M_1$ .

LEGS: Spurs lacking on mid and hind tibiae. Paronychium (figs. 30, 31) as described for the two included subgenera. Claw (figs. 30, 31) relatively long, at least three times as long as width at base and with its dorsal margin gradually curved. Tooth from near middle of claw and with its dorsal margin about equal to or longer than width of claw at base. Pulvillus (figs. 30, 31) narrow and greatly reduced, being from less than one-half to one-half width of claw at base.

GENITALIA: Male (figs. 6, 7, 14, 15) with uncus very slender, much more so than in *Tatochila* and *Phulia*, and gradually produced into a finger-like process that is neither constricted near the middle (in lateral view) nor swollen behind tip; lateroventral walls at base of uncus neither infolded nor possessing internal ridges; subscaphium present, although sometimes poorly developed; harpe either acuminate or broadly produced apically; anellus as in *Phulia*, *Hypsochila*, and *Tatochila*, lacking dorsal plate; aedeagus not different from *Phulia*, *Hypsochila*, and group E of *Tatochila*. [The five groups of *Tatochila* are defined in another paper, in press.]

Female (figs. 39, 40) with ductus bursae shorter than bursa copulatrix (without the accessory pouch), colorless and nonsclerotized and with other characters as described for the two included subgenera.

HABITUS: Hindwing and apex of forewing below with a white to cream or pink ground color, entirely and heavily irrorated with black scales giving a gray or pinkish gray appearance. Hindwing without long brown, gray, or black bars and stripes but usually with a submesial series of dark spots.

*Piercolias* is here divided into two subgenera. First, the subgenus *Piercolias* for the species traditionally placed in the genus by that name, and second, for two species usually placed in *Phulia*. The latter are included with *Piercolias* because they have essentially the same type of uncus, vein  $Cu_2$  on the hindwing has the same point of

origin, the female genitalia are similar, and there is a great similarity in habitus. These facts were taken as better reasons for associating these two species with *Piercolias* than with *Phulia*, in spite of their similarity to the latter in such structures as claws and the number of radial veins. The number of radial veins, while usually regarded as of generic importance, sometimes certainly amounts to less than that. This is shown by the existence of two species in the subgenus *Infraphulia* of *Phulia*, one having three radial veins, and a second, very closely related species, having only two radial veins (the greatest reduction of radials known for the family).

### *Piercolias* (*Pierphulia*), new subgenus

TYPE: *Phulia nysiella* Röber=*Piercolias* (*Pierphulia*) *nysiella* (Röber).

Differing from *Piercolias* (*Piercolias*) in the number of radial veins of forewing, in length of tibia of foreleg, in uncus, subscaaphium and harpe, and in female genitalia as well as in the paronychium and claw.

VENATION: Figure 22. Forewing with three radial veins,  $R_4$  and  $R_5$  having anastomosed with  $R_3$ ;  $M_1$  and  $M_2$  both stalked with base of  $R_{3+4+5}$ . Hindwing with  $M_1$  distinctly shorter than  $Cu_1$ .

LEGS: Foreleg with tibia shorter than first tarsal subsegment. Paronychium (fig. 30) greatly reduced, being about one-third to less than one-half length of claw, tapering to a point, slightly constricted beyond middle and with its width at base one-half its length. Claw (fig. 30) similar to *Phulia*, abruptly directed downward with its long axis nearly parallel to basal margin. Tooth approximate to distal portion of claw.

GENITALIA: Male (figs. 6, 14) with uncus short and slender, shorter than length of tegumen; ventral opening for anal tube about two-thirds length of entire uncus; subscaaphium small and weak; harpe broadly produced apically, not acuminate and without a clasper flap or lobe on inner face.

Female (fig. 39) with eighth tergite not developed in dorsal region, forming two triangular lateral plates; eighth sternite with outer genital plates large and reticulated; inner genital plate greatly reduced and subtriangular in shape and slightly setulose, lacking a posterior finger-like process.

#### SPECIES:

1. *Piercolias* (*Pierphulia*) *nysiella* (Röber), in Seitz, Die Gross-Schmetterlinge der Erde . . . , vol. 5, p. 98, pl. 28, fig. d6, 1909 (*Phulia*).
2. *Piercolias* (*Pierphulia*) *nysias* (Weymer), in Weymer and Maassen, in Stübel and Reiss, Reisen in Sud-Amerika . . . Lepidopteren . . . pp. 98, 125, pl. 4, fig. 11, 1890 (*Phulia*).

*Piercolias (Piercolias) Staudinger*

Reference and type species as given under the genus.

Distinguished from *Piercolias (Pierphulia)* in the number of radial veins of forewing, in length of tibia of foreleg, in uncus, subscaphium and harpe, and in female genitalia as well as in paronychium and claw.

VENATION: Figure 23. Forewing with four radial veins,  $R_5$  having anastomosed with  $R_4$ ;  $M_1$  stalked for more than one-third its length with base of  $R_3$  and  $R_4$ ;  $M_2$  from slightly below apex of cell; hindwing with  $M_1$  longer than  $Cu_1$ .

LEGS: Foreleg with tibia longer than first tarsal subsegment. Paronychium (fig. 31) relatively large, at least two-thirds length of claw, tapering to a blunt point, constricted near the base or near middle and with its width at base from slightly more than one-fifth to about one-fourth its length. Claw (fig. 31) not as abruptly directed downward as in *Pierphulia* and with its long axis divergent from basal margin. Tooth divergent from distal portion of claw.

GENITALIA: Male (figs. 7, 15) with uncus long and slender, as long as length of tegumen; ventral opening for anal tube about one-fourth length of entire uncus; subscaphium large and heavily sclerotized; harpe acuminate and with a large clasper lobe near middle on inner face.

Female (fig. 40) with eighth tergite entire and semiannulate; eighth sternite with outer genital plates large and smooth, inner plates not at all reduced, setulose and each divided into a broad outwardly dentate anterior section and a large club-shaped posterior process.

## SPECIES:

1. *Piercolias (Piercolias) huanaco* (Staudinger), Deutsche Ent. Zeitschr., "Iris," Dresden, vol. 7, pt. 1, pp. 56-59, pl. 1, figs. 7, 16, 18, 1894 (*Trifurcula*).
2. *Piercolias (Piercolias) coropunae* (Dyar), Proc. U. S. Nat. Mus., vol. 45, p. 629, 1913 (*Andina*).

*Baltia Moore*

*Baltia Moore*, Ann. Mag. Nat. Hist., ser. 5, vol. 1, p. 228, 1878.

TYPE: *Mesapia shawi* Bates = *Baltia shawi* (Bates). Type by reason of being sole included species.

*Baltia* differs from all the other genera in the form of the harpe and in the venation of forewing. From *Piercolias (Pierphulia)* and *Phulia* it differs in the number of radial veins of forewing and from *Piercolias (Piercolias)*, *Hypsochila*, *Tatochila*, and *Theochila* in the stalking of vein  $M_2$  on forewing and in claw, pulvillus and paronychium. From the last two genera it differs also in lacking tibial spurs on the mid and hind legs.



**VENATION:** Figure 24. Forewing with four radial veins,  $R_5$  having anastomosed with  $R_4$ ;  $R_1$  long, only slightly shorter than  $R_2$ ;  $R_2$  from distinctly before apex of cell;  $M_2$  stalked for some distance with base of  $R_{3+4+5}+M_1$ . Hindwing with  $Cu_2$  from distinctly beyond middle of cell and not opposite to origin of  $R_5$  and with distance between bases of veins  $Sc+R_1$  and  $R_5$  about equal to the distance between  $Cu_2$  and  $M_3$ ; distance between veins  $Cu_1$  and  $Cu_2$  equal to or less than distance between bases of  $R_5$  and  $M_1$ .

**LEGS:** Tibial spurs lacking on mid and hind tibiae. Paronychium (fig. 32) (not absent as reported by Klots, loc. cit., pp. 146, 219) from nearly one-third to slightly more than one-half length of claw. Claw (fig. 32) directed downward, but not as much so as in *Phulia*; dorsal margin gradually curved; its long axis divergent from basal margin; relatively long, at least three times as long as width at base. Tooth divergent, originating from near middle, only slightly smaller than distal part of claw and with its dorsal margin about equal to width of claw at base. Pulvillus (fig. 32) narrow and greatly reduced, being less than one-half to one-half width of claw at base.

**GENITALIA:** Male (figs. 8, 16) with uncus relatively broad at the base, not longer than the tegumen, being about one-half the length of tegumen in the type species (*B. shawi*) and nearly as long as the tegumen in the second species (*B. butleri*); slightly constricted near middle and very gradually produced to a blunt tip; very slightly swollen just behind tip; with very weakly developed lateroventral internal ridges; harpe not produced apically, more rounded than in *Phulia* (*Infraphulia*) and *Piercolias* (*Pierphulia*); subscahium well developed, but not as much so as in *Piercolias* (*Piercolias*); anellus without a dorsal plate; aedeagus in lateral view not distinctly broader distally than through middle, dorsal incision deeper than in *Phulia* and about as in *Piercolias*.

Female (fig. 33) hardly distinct from *Piercolias* (*Pierphulia*) except that the ductus bursae is longer than the bursa copulatrix with the accessory pouch. Ductus bursae colorless and nonsclerotized; eighth tergite nonsclerotized dorsally or only very poorly sclerotized dorsally; eighth sternite with outer genital plate large and reticulate; inner genital plate weakly setulose with posterior process very greatly reduced and anterior lobe broadly rounded and sometimes reduced but not as much so as in *Phulia* (*Infraphulia*).

**HABITUS:** The two species included in this genus present two rather different types of color pattern. In both there is a large discocellular spot on both surfaces of the forewing. The hindwing underneath in one type (*Baltia shawi*) somewhat resembles *Piercolias* (*Pierphulia*) in having a white ground color that is heavily irrorated with black

scales and with a submesial series of dark spots. However, it has in addition a black spot at the end of the cell on this wing. In the second type (*Baltia butleri*) there is some superficial resemblance to the color pattern of *Phulia*; however, it is distinctly different in having two black spots at end of cell on hindwing on both surfaces, in having a pinkish instead of yellowish ground color on hindwing and apex of forewing below, in lacking the black stripes found in the middle of cell and in interspace  $Cu_2$ , and in lacking the submesial series of black spots between the veins that are found in *Phulia*.

SPECIES:

1. *Baltia shawi* (Bates), in Henderson and Hume, Lahore to Yarkand, pp. 305, 306, 1873 (*Mesapia*).
2. *Baltia butleri* (Moore), Proc. Zool. Soc. London (1882), p. 256, pl. 2, figs. 6, 6a, 1882 (*Synchloë*).

## EXPLANATION OF THE SYMBOLS USED ON THE FIGURES

MALE GENITALIA: *Ae*, aedeagus; *An*, anellus or junta; *ap*, articulatory process of tegumen; *AT*, anal tube; *clpl*, clasper lobe; *Hp*, harpe; *ip*, inner plate of uncus; *Sac*, saccus; *Subs*, subscaphium; *Teg*, tegumen; *U*, uncus; *Vm*, vinculum.

FEMALE GENITALIA: *acp*, accessory pouch of bursa copulatrix; *al*, anterior lobe of inner genital plate; *ap*, anterior apophysis; *Bc*, bursa copulatrix; *Db*, ductus bursae; *ds*, ductus seminalis; *fp*, finger-like process of inner genital plate; *igp*, inner genital plate; *Ob*, ostium bursae; *ogp*, outer genital plate; *Ov*, ovipositor; *S*, signum; *tg*, tergite.

OTHER SYMBOLS: *Cl*, claw; *Pr*, paronychium; *Pv*, pulvillus; *h*, humeral vein.

## EXPLANATION OF FIGURES 1-5

The figures are of the male genitalia in lateral view. The aedeagi have been removed and the lower drawings of same in figures 1-3 are in a ventral view. The anelli shown in these three figures have also been removed and show both a lateral and a flat view.

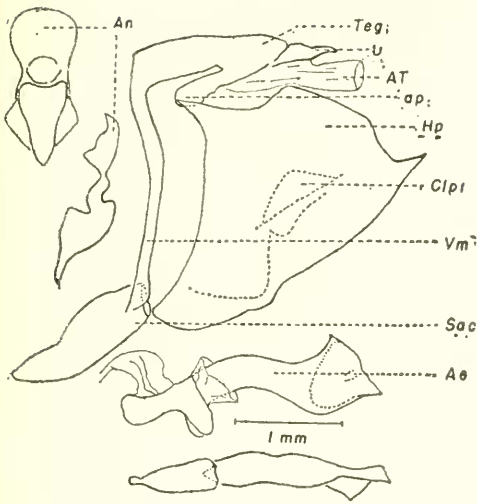
FIGURE 1.—*Theochila maenacte* (Boisduval). Type species of *Theochila*, new genus. Drawn from Preparation 107.

FIGURE 2.—*Tatochila autodice* (Hübner). Type species of *Tatochila* Butler. Drawn from Preparation 71.

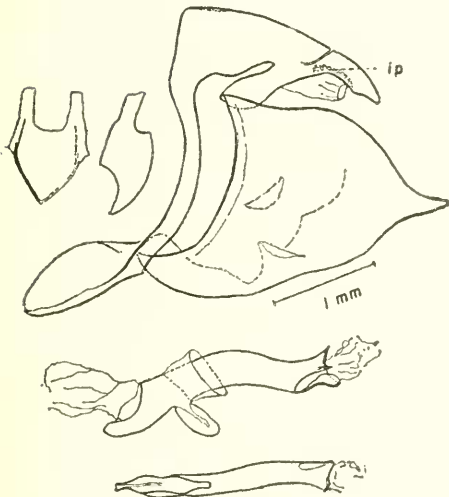
FIGURE 3.—*Hypsochila wagenknechti* (Ureta). Type species of *Hypsochila* Ureta. Drawn from Preparation 31.

FIGURE 4.—*Phulia* (*Phulia*) *nymphula* (Blanchard). Type species of *Phulia* Herrich-Schaeffer. Drawn from Preparation 230.

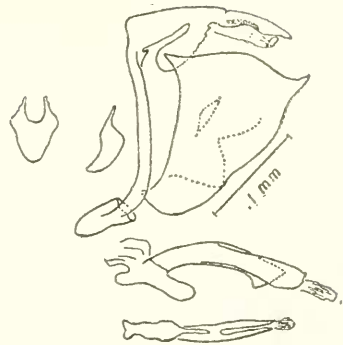
FIGURE 5.—*Phulia* (*Infraphulia*) *illimani* Weymer. Type species of *Infraphulia*, new subgenus. Drawn from Preparation 169.



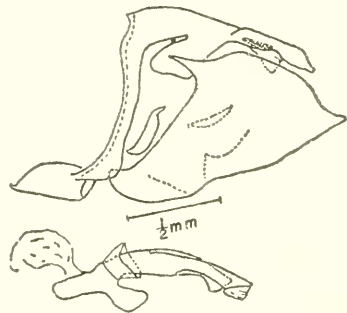
1. THEOCHILA



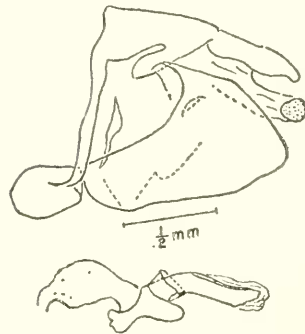
2. TATOCHILA



3. HYPISOCHILA



4. PHULIA (PHULIA)



5. PHULIA (INFRAPHULIA)

FIGURES 1-5.—Explanation on facing page.

## EXPLANATION OF FIGURES 6-16

Figures 6-8 are of male genitalia in lateral view with aedeagi removed. In figure 7 the subscaaphium is shown both fastened to anal tube in lateral view and detached and flat. Figures 9-16 are ventral views of the uncus and tegumen.

FIGURE 6.—*Piercolias* (*Pierphulia*) *nysiella* (Röber). Type species of *Pierphulia*, new subgenus. Drawn from Preparation 5343.

FIGURE 7.—*Piercolias* (*Piercolias*) *huanaco* (Staudinger). Type species of *Piercolias* Staudinger. Drawn from Preparation 155.

FIGURE 8.—*Baltia shawi* (Bates). Type species of *Baltia* Moore. Drawn from Preparation 5411.

FIGURE 9.—*Theochila maenacte* (Boisduval). Drawn from Preparation 107.

FIGURE 10.—*Tatochila autodice* (Hübner). Drawn from Preparation 22.

FIGURE 11.—*Hypsochila wagenknechti* (Ureta). Drawn from Preparation 31.

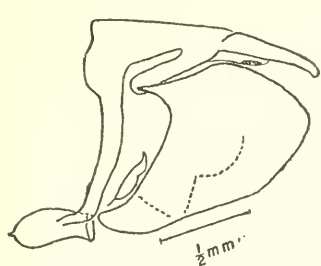
FIGURE 12.—*Phulia* (*Phulia*) *nymphula* (Blanchard). Drawn from Preparation 299.

FIGURE 13.—*Phulia* (*Infraphulia*) *illimani* Weymer. Drawn from Preparation 169.

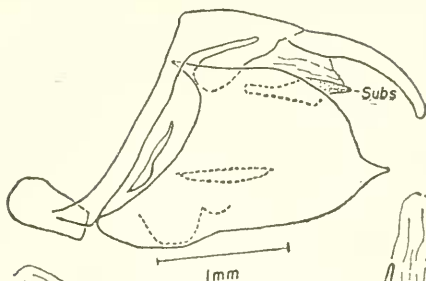
FIGURE 14.—*Piercolias* (*Pierphulia*) *nysiella* (Röber). Drawn from Preparation 5343.

FIGURE 15.—*Piercolias* (*Piercolias*) *huanaco* (Staudinger). Drawn from Preparation 5411.

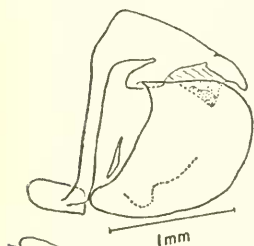
FIGURE 16.—*Baltia shawi* (Bates). Drawn from Preparation 5411.



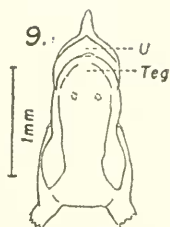
6. *PIERCOLIAS* (*PIERPHULIA*)



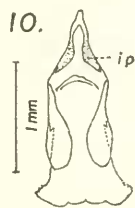
7. *PIERCOLIAS* (*PIERCOLIAS*)



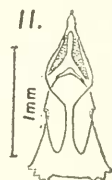
8. *BALTIA*



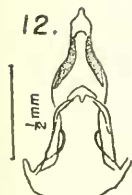
9. *THEOCHILA*



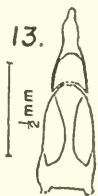
10. *TATOCHILA*



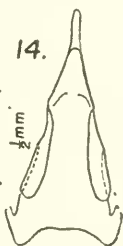
11. *HYPSOCHILA*



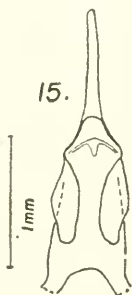
12. *PHULIA*  
(*PHULIA*)



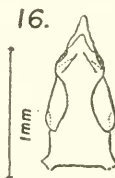
13. *PHULIA*  
(*INFRAPHULIA*)



14. *PIERCOLIAS*  
(*PIERPHULIA*)



15. *PIERCOLIAS*  
(*PIERCOLIAS*)



16. *BALTIA*

FIGURES 6-16.—Explanation on facing page.

## EXPLANATION OF FIGURES 17-24

The figures are of wing venation and are slightly larger than natural size.

FIGURE 17.—*Theochila maenacte* (Boisduval). Drawn from Slide 1148.

FIGURE 18.—*Tatochila autodice* (Hübner). Drawn from Slide 1151.

FIGURE 19.—*Hypsochila wagenknechti* (Ureta). Drawn from Slide 1159.

FIGURE 20.—*Phulia* (*Phulia*) *nymphula* (Blanchard). Drawn from Slide 114.

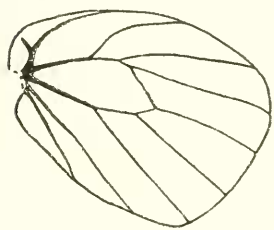
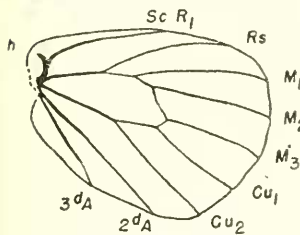
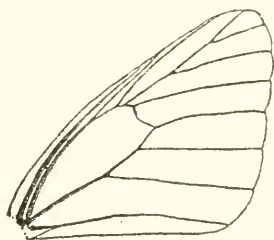
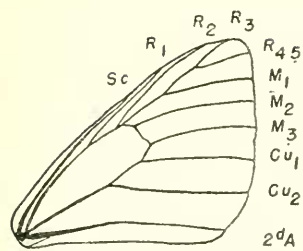
FIGURE 21.—*Phulia* (*Infraphulia*) *illimani* Weymer. Drawn from Slide 169.

FIGURE 22.—*Piercolias* (*Pierphulia*) *nysias* (Weymer). Drawn from Slide 180.

FIGURE 23.—*Piercolias* (*Piercolias*) *huanaco* (Staudinger). Drawn from Slide 155.

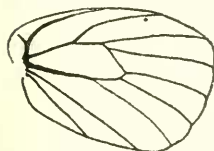
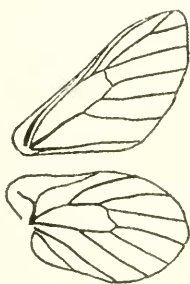
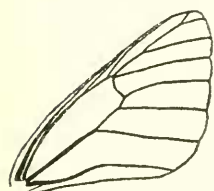
FIGURE 24.—*Balsia shawi* (Bates). Drawn from Slide 3810.





17. THEOCHILA

18. TATOCHILA

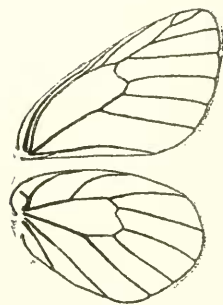
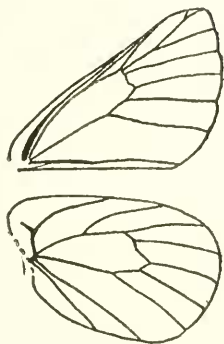
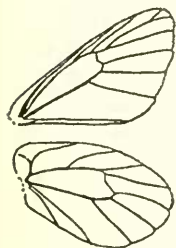


20. PHULIA  
(PHULIA)



21. PHULIA  
(INFRAPHULIA)

19. HYP SOCHILA



22. PIERCOLIAS  
(PIERPHULIA)

23. PIERCOLIAS  
(PIERCOLIAS)

24. BALTIA

FIGURES 17-24.—Explanation on facing page.

## EXPLANATION OF FIGURES 25-33

Figures 25 through 32 are greatly enlarged outline drawings of the claws, paronychia, and pulvilli. Setae and other armature are omitted, except on the paronychium in figure 27. All drawings are to the scale shown in figure 28.

Figure 33 is of the female genitalia showing lateral view, except for the bursa copulatrix, which is turned to show the signum in ventral view. The 7th tergite and the outer genital plate are shown only in dotted outlines to allow other structures to show up more clearly.

FIGURE 25.—*Theochila maenacte* (Boisduval.) Drawn from Preparation 1148.

FIGURE 26.—*Tatochila autodice* (Hübner). Drawn from Preparation 1151.

FIGURE 27.—*Hypsochila wagenknechti* (Ureta). Drawn from Preparation 1160.

FIGURE 28.—*Phulia (Phulia) nymphula nymphaea* (Staudinger). Drawn from Preparation 1172.

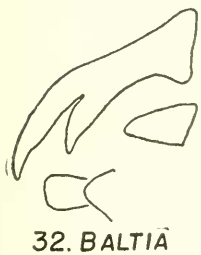
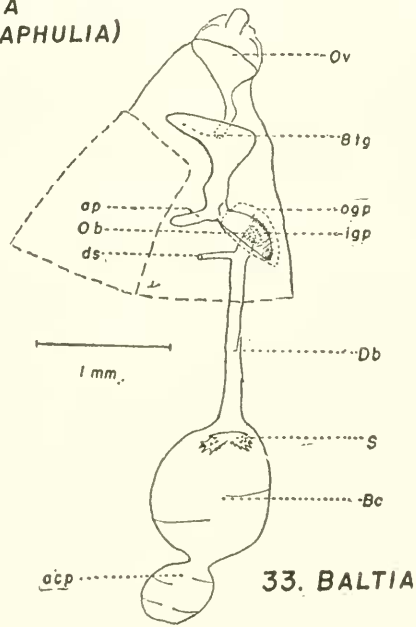
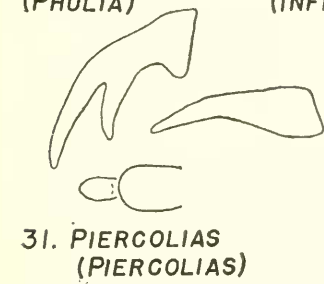
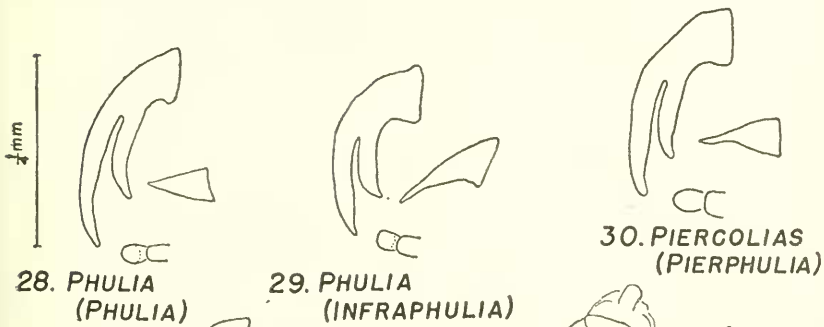
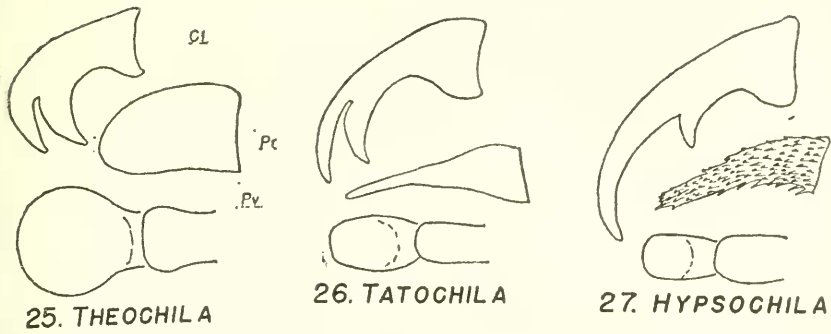
FIGURE 29.—*Phulia (Infraphulia) illimani* Weymer. Drawn from Preparation 1169.

FIGURE 30.—*Piercolias (Pierphulia) nysiella* (Röber). Drawn from Preparation 1165.

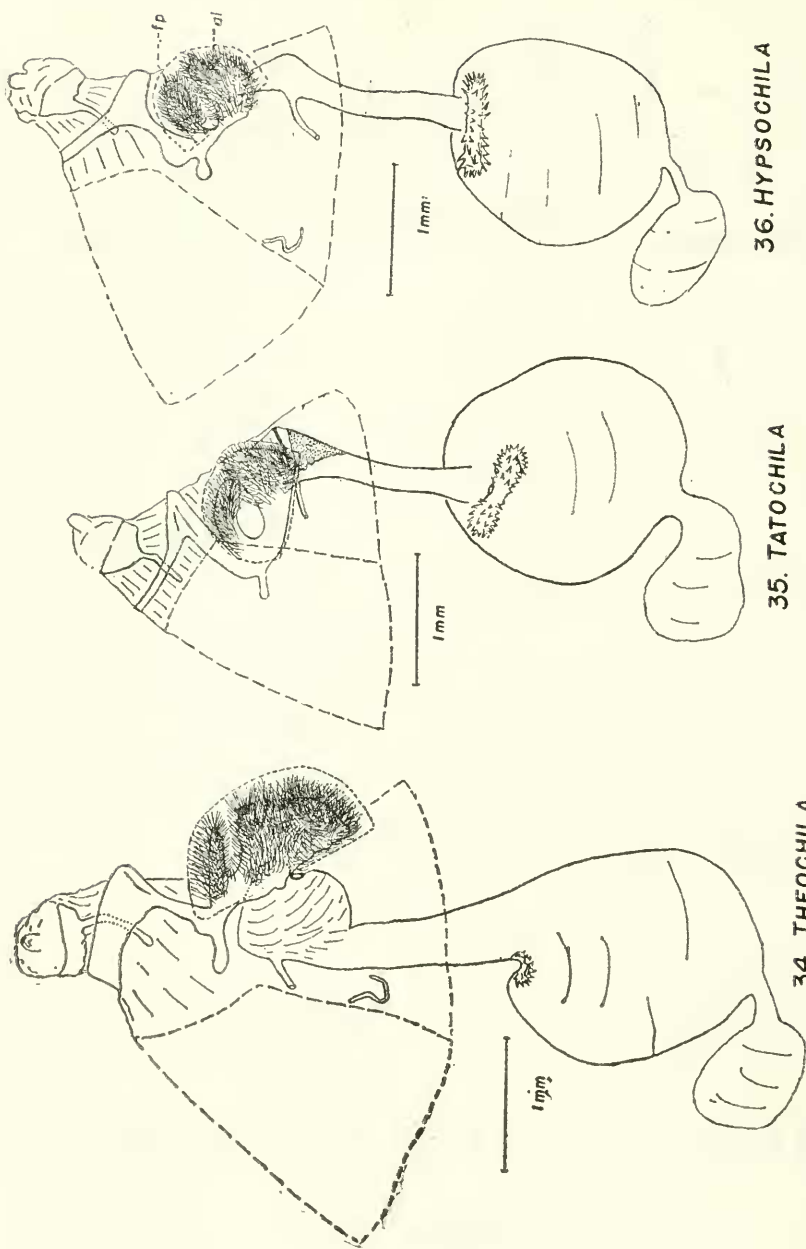
FIGURE 31.—*Piercolias (Piercolias) huanaco* (Staudinger). Drawn from Preparation 1167.

FIGURE 32.—*Baltia shawi* (Bates.) Drawn from Preparation 1168.

FIGURE 33.—*Baltia shawi* (Bates). Drawn from Preparation 5412.



FIGURES 25-33.—Explanation on facing page.

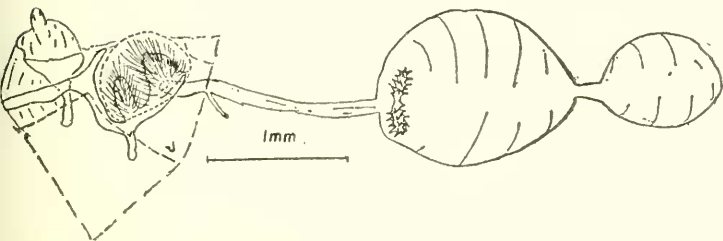


36. HYPSOCHILA

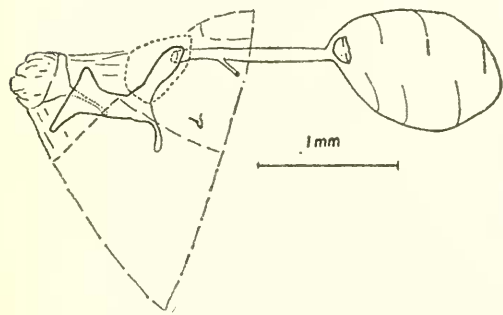
35. TATOCHILA

34. THEOCHILA

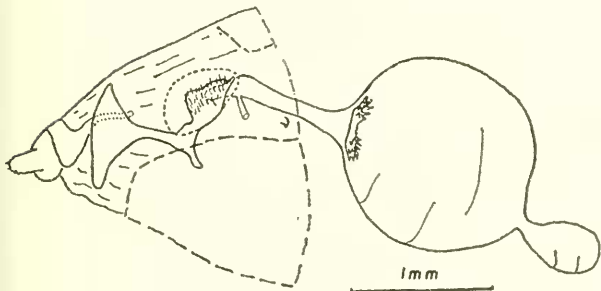
FIGURES 34-36.—Lateral views of female genitalia of: 34, *Theochila macracete* (Boisduval), drawn from Preparation 5354; 35, *Tatochila autoidice* (Hübner), drawn from Preparation 91; 36, *Hypsochila wagenknechtii* (Ureta), drawn from Preparation 105. In all figures the accessory pouch is turned slightly upward because of lack of space, and the 7th tergite and the outer genital plate are shown only in dotted outline. In figures 35 and 36 the bursa copulatrix is turned to show a ventral view of the signac.



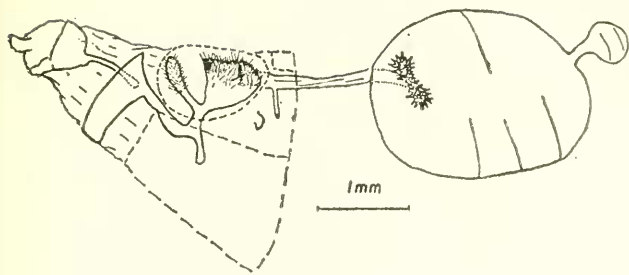
37. PHULIA (PHULIA)



38. PHULIA  
(INFRAPHULIA)



39. PIERCOLIAS  
(PIERPHULIA)



40. PIERCOLIAS  
(PIERCOLIAS)

FIGURES 37-40.—Lateral views of female genitalia of: 37, *Phulia (Phulia) nymphula* (Blanchard), drawn from Preparation 272; 38, *Phulia (Infraphulia) illimani* Weymer, drawn from Preparation 170; 39, *Piercolias (Pierphulia) nyctella* (Röber), drawn from Preparation 5344; 40, *Piercolias (Piercolias) huanaco* (Staudinger), drawn from Preparation 5346. The bursa copulatrix is turned to show a ventral view of the signae; the 7th tergite and the outer genital plate are shown only in dotted outline.